

Cryogenic Propellant Storage and Transfer Technology Demonstration: Advancing Technologies for Future Mission Architectures Beyond Low Earth Orbit

Kent T. Chojnacki and Deborah J. Crane
NASA Marshall Space Flight Center, Huntsville, Alabama

Susan M. Motil, Carol A. Ginty, and Todd A. Tofil
NASA Glenn Research Center, Cleveland, Ohio, 44135

As part of U.S. National Space Policy, NASA is seeking an innovative path for human space exploration, which strengthens the capability to extend human and robotic presence throughout the solar system. NASA is laying the groundwork to enable humans to safely reach multiple potential destinations, including the Moon, asteroids, Lagrange points, and Mars and its environs. In support of this, NASA is embarking on the Technology Demonstration Mission Cryogenic Propellant Storage and Transfer (TDM CPST) Project to test and validate key cryogenic capabilities and technologies required for future exploration elements, opening up the architecture for large cryogenic propulsion stages and propellant depots. The TDM CPST will provide an on-orbit demonstration of the capability to store, transfer, and measure cryogenic propellants for a duration that enables long term human space exploration missions beyond low Earth orbit. This paper will present a summary of the cryogenic fluid management technology maturation effort, infusion of those technologies into flight hardware development, and a summary of the CPST preliminary design.